

IN THE CLAIMS:

Claims 5, 10, 14, 18 and 34 were previously cancelled. Claims 7, 19, 22, 26-29, and 31-33 have been amended herein. All of the pending claims are presented below. This listing of claims will replace all prior versions and listings of claims in the application. Please enter these claims as amended.

Listing of Claims:

1. (Previously presented) A stackable assembly comprising:
a first carrier having a cavity therein, an upper surface, a lower surface, at least one aperture extending therethrough, a first frustoconical surface on a portion thereof, a second frustoconical surface on another portion thereof, a lip on a portion of a bottom surface thereof, and a plurality of circuits located in a portion of the cavity extending to the at least one aperture;
a semiconductor device having an active surface having a plurality of bond pads thereon, the semiconductor device located within the cavity of the first carrier;
a first connector between at least one circuit of the plurality of circuits located in the portion of the cavity of the first carrier and at least one bond pad of the plurality of bond pads on the active surface of the semiconductor device;
encapsulant material filling the portion of the cavity in the first carrier; and
connector material located in the at least one aperture in the first carrier.

2. (Original) The stackable assembly of claim 1, further comprising:
a substrate having an upper surface, a lower surface, and a plurality of circuits on the upper surface thereof; and
at least one second connector connected to the connector material in the at least one aperture in the first carrier and at least one circuit of the plurality of circuits on the upper surface of the substrate.

3. (Original) The stackable assembly of claim 1, wherein the first carrier includes at least one fin on a portion thereof.

4. (Previously presented) The stackable assembly of claim 1, further comprising:
a second carrier oriented with respect to the first carrier and positioned in the same direction as the first carrier and further having a cavity therein, an upper surface, a lower surface, at least one aperture therethrough, and a plurality of circuits located in a portion of the cavity thereon connected to the at least one aperture therethrough;
a second semiconductor device having an active surface having a plurality of bond pads thereon, the second semiconductor device located within the cavity of the second carrier;
another first connector between at least one circuit of the plurality of circuits located in the portion of the cavity of the second carrier and at least one bond pad of the plurality of bond pads on the active surface of the second semiconductor device located in the cavity of the second carrier;
encapsulant material filling the portion of the cavity in the second carrier; and
connector material located in a second aperture in the second carrier connected to the connector material in the at least one aperture in the first carrier.

5. (Cancelled)

6. (Previously presented) A stackable semiconductor device assembly comprising:
a first carrier having a cavity therein, an upper surface, a lower surface, at least one aperture extending therethrough, a first frustoconical surface on a portion thereof, a second frustoconical surface on another portion thereof, a lip on a portion of a bottom surface thereof, and a plurality of circuits located in a portion of the cavity extending to the at least one aperture;
a semiconductor device having an active surface having a plurality of bond pads thereon, the semiconductor device located within the cavity of the first carrier;
a first connector between at least one circuit of the plurality of circuits located in the portion of the cavity of the first carrier and at least one bond pad of the plurality of bond pads on the active surface of the semiconductor device;
encapsulant material filling a portion of the cavity in the first carrier; and
connector material located in the at least one aperture in the first carrier.

7. (Currently amended) The stackable semiconductor device assembly of claim 6, further comprising:
a substrate having an upper surface, a lower surface, and a plurality of circuits on the upper surface thereof; and
at least one second connector connected to the connector material in the at least one aperture in the first carrier and at least one circuit of the plurality of circuits on the upper surface of the substrate.

8. (Original) The stackable semiconductor device assembly of claim 6, wherein the first carrier includes at least one fin on a portion thereof.

9. (Previously presented) The stackable semiconductor device assembly of claim 6, further comprising:

a second carrier oriented with respect to the first carrier and positioned in the same direction as the first carrier and further having a cavity therein, an upper surface, a lower surface, at least one aperture therethrough, and a plurality of circuits located in a portion of the cavity therein connected to the at least one aperture therethrough;

a second semiconductor device having an active surface having a plurality of bond pads thereon, the second semiconductor device located within the cavity of the second carrier;

another first connector between at least one circuit of the plurality of circuits located in the portion of the cavity of the second carrier and at least one bond pad of the plurality of bond pads on the active surface of the second semiconductor device located within the cavity of the second carrier;

encapsulant material filling a portion of the cavity in the second carrier; and

connector material located in a second aperture in the second carrier connected to the connector material in the at least one aperture in the first carrier.

10. (Cancelled)

11. (Previously presented) A stackable assembly comprising:
- a substrate having an upper surface, a lower surface, and a plurality of circuits on the upper surface thereof;
 - a first carrier having a cavity therein, an upper surface, a lower surface, at least one aperture extending therethrough, a first frustoconical surface on a portion thereof, a second frustoconical surface on another portion thereof, a lip on a portion of a bottom surface thereof, and a plurality of circuits located in a portion of the cavity extending to the at least one aperture;
 - a semiconductor device having an active surface having a plurality of bond pads thereon, the semiconductor device located within the cavity of the first carrier;
 - a first connector between at least one circuit of the plurality of circuits located in the portion of the cavity of the first carrier and at least one bond pad of the plurality of bond pads on the active surface of the semiconductor device;
 - encapsulant material filling the portion of the cavity in the first carrier;
 - connector material located in the at least one aperture in the first carrier; and
 - at least one second connector connected to the connector material in the at least one aperture in the first carrier and at least one circuit of the plurality of circuits on the upper surface of the substrate.
12. (Original) The stackable assembly of claim 11, wherein the first carrier includes at least one fin on a portion thereof.

13. (Previously presented) The stackable assembly of claim 11, further comprising:
a second carrier oriented with respect to the first carrier and positioned in the same direction as the first carrier and further having a cavity therein, an upper surface, a lower surface, at least one aperture therethrough, and a plurality of circuits located in a portion of the cavity therein connected to the at least one aperture therethrough;
a second semiconductor device having an active surface having a plurality of bond pads thereon, the second semiconductor device located within the cavity of the second carrier;
another first connector between at least one circuit of the plurality of circuits located in the portion of the cavity of the second carrier and at least one bond pad of the plurality of bond pads on the active surface of the second semiconductor device located within the cavity of the second carrier;
encapsulant material filling a portion of the cavity in the second carrier; and
connector material located in a second aperture in the second carrier connected to the connector material in the at least one aperture in the first carrier.

14. (Cancelled)

15. (Previously presented) A stackable semiconductor device assembly comprising:
a substrate having an upper surface, a lower surface, and a plurality of first circuits on the upper surface thereof;
a first carrier having a cavity therein, an upper surface, a lower surface, at least one aperture extending therethrough, a first frustoconical surface on a portion thereof, a second frustoconical surface on another portion thereof, a lip on a portion of a bottom surface thereof, and a plurality of second circuits located in a portion of the cavity extending to the at least one aperture;
a semiconductor device having an active surface having a plurality of bond pads thereon, the semiconductor device located within the cavity of the first carrier;
a first connector between at least one second circuit of the plurality of second circuits located in the portion of the cavity of the first carrier and at least one bond pad of the plurality of bond pads on the active surface of the semiconductor device;
encapsulant material filling the portion of the cavity in the first carrier;
connector material located in the at least one aperture in the first carrier; and
at least one second connector connected to the connector material in the at least one aperture in the first carrier and at least one first circuit of the plurality of first circuits on the upper surface of the substrate.

16. (Original) The stackable semiconductor device assembly of claim 15, wherein the first carrier includes at least one fin on a portion thereof.

17. (Previously presented) The stackable semiconductor device assembly of claim 15, further comprising:

- a second carrier oriented with respect to the first carrier and positioned in the same direction as the first carrier and further having a cavity therein, an upper surface, a lower surface, at least one aperture therethrough, and a plurality of circuits located in a portion of the cavity therein connected to the at least one aperture therethrough;
- a second semiconductor device having an active surface having a plurality of bond pads thereon, the second semiconductor device located within the cavity of the second carrier;
- another first connector between at least one circuit of the plurality of circuits located in the portion of the cavity of the second carrier and at least one bond pad of the plurality of bond pads on the active surface of the second semiconductor device located within the cavity of the second carrier;
- encapsulant material filling the portion of the cavity in the second carrier; and
- connector material located in a second aperture in the second carrier connected to the connector material in the at least one aperture in the first carrier.

18. (Cancelled)

19. (Currently amended) A stackable assembly comprising:

- a substrate having an upper surface, a lower surface, and a plurality of circuits on the upper surface thereof;
- a first carrier having a cavity therein, an upper surface, a lower surface, at least one aperture extending therethrough, a first frustoconical surface on a portion thereof, a second frustoconical surface on another portion thereof, a lip on a portion of a bottom surface thereof, and a plurality of circuits located in a portion of the cavity extending to the at least one aperture;
- a first semiconductor device having an active surface having a plurality of bond pads thereon, the first semiconductor device located within the cavity of the first carrier;

a first connector between at least one circuit of the plurality of circuits located in the portion of the cavity of the first carrier and at least one bond pad of the plurality of bond pads on the active surface of the first semiconductor device;

encapsulant material filling the portion of the cavity in the first carrier;

a first connector material located in the at least one aperture in the first carrier;

at least one second connector connected to the first connector material in the at least one aperture in the first carrier and at least one circuit of the plurality of circuits on the upper surface of the substrate;

a second carrier oriented with respect to the first carrier and positioned in the same direction as the first carrier and further having a cavity therein, an upper surface, a lower surface, a plurality of connection pads on the upper surface thereof, a plurality of connection pads on the lower surface thereof, at least one first circuit of a plurality of first circuits connecting at least one connection pad of the plurality of connection pads on the upper surface thereof to at least one connection pad of the plurality of connections pads on the lower surface thereof, and at least one second circuit of a plurality of second circuits located in a portion of the cavity therein connected to the at least one connection pad of the plurality of connection pads on the upper surface thereof and the at least one connection pad of the plurality of connection pads on the lower surface;

a second semiconductor device having an active surface having a plurality of bond pads thereon, the second semiconductor device located within the cavity of the second carrier;

a third connector between the at least one second circuit of the plurality of second circuits located in the portion of the cavity of the second carrier and at least one bond pad of the plurality of bond pads on the active surface of the second semiconductor device;

encapsulant material filling the portion of the cavity in the second carrier;

at least one fourth connector connected to the at least one connection pad of the plurality of connection pads on the lower surface of the second carrier and at least one circuit of a plurality of circuits on the ~~lower~~ upper surface of the substrate.

20. (Original) The stackable assembly of claim 19, wherein the first carrier includes at least one fin on a portion thereof.

21. (Previously presented) The stackable assembly of claim 19, further comprising:
a third carrier oriented with respect to the first carrier and positioned in the same direction as the first carrier and further having a cavity therein, an upper surface, a lower surface, a plurality of connection pads on the upper surface thereof, a plurality of connection pads on the lower surface thereof, at least one first circuit of a plurality of first circuits connecting at least one connection pad of the plurality of connection pads on the upper surface thereof to at least one connection pad of the plurality of connection pads on the lower surface thereof, and at least one second circuit of a plurality of second circuits located in a portion of the cavity therein connected to the at least one connection pad of the plurality of connection pads on the upper surface thereof and the at least one connection pad of the plurality of connection pads on the lower surface thereof;
a third semiconductor device having an active surface having a plurality of bond pads thereon, the third semiconductor device located within the cavity of the third carrier;
a fifth connector between the at least one second circuit of the plurality of second circuits located in the portion of the cavity of the third carrier and at least one bond pad of the plurality of bond pads on the active surface of the third semiconductor device; and
encapsulant material filling the portion of the cavity in the third carrier.

22. (Currently amended) A stackable semiconductor device assembly comprising:
- a substrate having an upper surface, a lower surface, and a plurality of circuits on the upper surface thereof;
 - a first carrier having a cavity therein, an upper surface, a lower surface, at least one aperture extending therethrough, a first frustoconical surface on a portion thereof, a second frustoconical surface on another portion thereof, a lip on a portion of a bottom surface thereof, and a plurality of circuits located in a portion of the cavity extending to the at least one aperture;
 - a first semiconductor device having an active surface having a plurality of bond pads thereon, the first semiconductor device located within the cavity of the first carrier;
 - a first connector between at least one circuit of the plurality of circuits located in the portion of the cavity of the first carrier and at least one bond pad of the plurality of bond pads on the active surface of the first semiconductor device;
 - encapsulant material filling the portion of the cavity in the first carrier;
 - a first connector material located in the at least one aperture in the first carrier;
 - at least one second connector connected to the first connector material located in the at least one aperture in the first carrier and at least one circuit of the plurality of circuits on the upper surface of the substrate;
 - a second carrier oriented with respect to the first carrier and positioned in the same direction as the first carrier and further having a cavity therein, an upper surface, a lower surface, a plurality of connection pads on the upper surface thereof, a plurality of connection pads on the lower surface thereof, at least one first circuit of a plurality of first circuits connecting at least one connection pad of the plurality of connection pads on the upper surface thereof to at least one connection pad of the plurality of connection pads on the lower surface thereof, and at least one second circuit of a plurality of second circuits located in a portion of the cavity therein connected to the at least one connection pad of the plurality of connection pads on the upper surface thereof and the at least one connection pad of the plurality of connection pads on the lower surface thereof;

a second semiconductor device having an active surface having a plurality of bond pads thereon,
the second semiconductor device located within the cavity of the second carrier;
a third connector between the at least one second circuit of the plurality of second circuits located
in the portion of the cavity of the second carrier and at least one bond pad of the plurality
of bond pads on the active surface of the second semiconductor device;
encapsulant material filling the portion of the cavity in the second carrier;
at least one fourth connector connected to the at least one connection pad of the plurality of
connection pads on the lower surface of the second carrier and at least one circuit of a
plurality of circuits on the ~~lower~~ upper surface of the substrate.

23. (Original) The stackable semiconductor device assembly of claim 22, wherein the
first carrier includes at least one fin on a portion thereof.

24. (Previously presented) The stackable semiconductor device assembly of claim 22,
further comprising:

a third carrier oriented with respect to the first carrier and positioned in the same direction as the
first carrier and further having a cavity therein, an upper surface, a lower surface, a
plurality of connection pads on the upper surface thereof, a plurality of connection pads
on the lower surface thereof, a first circuit of a plurality of first circuits connecting at least
one connection pad of the plurality of connection pads on the upper surface thereof to at
least one connection pad of the plurality of connection pads on the lower surface thereof,
and at least one second circuit of a plurality of second circuits located in a portion of the
cavity therein connected to the at least one connection pad of the plurality of connection
pads on the upper surface thereof and the at least one connection pad of the plurality of
connection pads on the lower surface thereof;
a third semiconductor device having an active surface having a plurality of bond pads thereon,
the third semiconductor device located within the cavity of the third carrier;

a fifth connector between the at least one second circuit of the plurality of second circuits located in the portion of the cavity of the third carrier and at least one bond pad of the plurality of bond pads on the active surface of the third semiconductor device; and encapsulant material filling the portion of the cavity in the third carrier.

25. (Previously presented) An assembly for a substrate comprising:
a first carrier having a cavity therein, an upper surface, a lower surface, at least one aperture extending therethrough, a first frustoconical surface on a portion thereof, a second frustoconical surface on another portion thereof, a lip on a portion of a bottom surface thereof, and a plurality of circuits located in a portion of the cavity extending to the at least one aperture;
a semiconductor device having an active surface having a plurality of bond pads thereon, the semiconductor device located within the cavity of the first carrier;
a first connector between at least one circuit of the plurality of circuits located in the portion of the cavity of the first carrier and at least one bond pad of the plurality of bond pads on the active surface of the semiconductor device;
encapsulant material filling the portion of the cavity in the first carrier; and
connector material located in the at least one aperture in the first carrier.

26. (Currently amended) The assembly for a substrate of claim 25, further comprising:
a substrate having an upper surface, a lower surface, and a plurality of circuits on the upper surface thereof; and
at least one second connector connected to the connector material in the at least one aperture in the first carrier and at least one circuit of the plurality of circuits on the upper surface of the substrate.

27. (Currently amended) The ~~stackable assembly~~ for a substrate of claim 25, wherein the first carrier includes at least one fin on a portion thereof.

28. (Currently amended) The ~~stackable assembly~~ for a substrate of claim 25, further comprising:

a second carrier oriented with respect to the first carrier and positioned the same direction as the first carrier and further having a cavity therein, an upper surface, a lower surface, at least one aperture therethrough, and a plurality of circuits located in a portion of the cavity thereon connected to the at least one aperture therethrough;

a semiconductor device having an active surface having a plurality of bond pads thereon, the semiconductor device located within the cavity of the second carrier;

a first connector between at least one circuit of the plurality of circuits located in the portion of the cavity of the second carrier and at least one bond pad of the plurality of bond pads on the active surface of the semiconductor device located in the cavity of the second carrier;

encapsulant material filling the portion of the cavity in the second carrier; and

connector material located in a second aperture in the second carrier connected to the connector material in the at least one aperture in the first carrier.

29. (Currently amended) The ~~stackable assembly of claim 25,~~ assembly for a substrate of claim 28, wherein the ~~first~~ second carrier includes a first frustoconical surface on a portion thereof, a second frustoconical surface on another portion thereof, and a lip on a portion of a bottom surface thereof.

30. (Previously presented) A semiconductor device assembly for a substrate comprising:

- a first carrier having a cavity therein, an upper surface, a lower surface, at least one aperture extending therethrough, a first frustoconical surface on a portion thereof, a second frustoconical surface on another portion thereof, a lip on a portion of a bottom surface thereof, and a plurality of circuits located in a portion of the cavity extending to the at least one aperture;
- a semiconductor device having an active surface having a plurality of bond pads thereon, the semiconductor device located within the cavity of the first carrier;
- a first connector between at least one circuit of the plurality of circuits located in the portion of the cavity of the first carrier and at least one bond pad of the plurality of bond pads on the active surface of the semiconductor device;
- encapsulant material filling a portion of the cavity in the first carrier; and
- connector material located in the at least one aperture in the first carrier.

A semiconductor device assembly for a substrate comprising:

- a first carrier having a cavity therein, an upper surface, a lower surface, at least one aperture extending therethrough, and a plurality of circuits located in a portion of the cavity extending to the at least one aperture;
- a semiconductor device having an active surface having a plurality of bond pads thereon, the semiconductor device located within the cavity of the first carrier;
- a first connector between at least one circuit of the plurality of circuits located in the portion of the cavity of the first carrier and at least one bond pad of the plurality of bond pads on the active surface of the semiconductor device;
- encapsulant material filling a portion of the cavity in the first carrier; and
- connector material located in the at least one aperture in the first carrier.

31. (Currently amended) The ~~stackable~~-semiconductor device assembly for a substrate of claim 30, further comprising:
a substrate having an upper surface, a lower surface, and a plurality of circuits on the upper surface thereof; and
at least one second connector connected to the connector material in the at least one aperture in the first carrier and at least one circuit of the plurality of circuits on the upper surface of the substrate.

32. (Currently amended) The ~~stackable~~-semiconductor device assembly for a substrate of claim 30, wherein the first carrier includes at least one fin on a portion thereof.

33. (Currently amended) The ~~stackable~~-semiconductor device assembly for a substrate of claim 30, further comprising:
a second carrier oriented with respect to the first carrier and positioned the same direction as the first carrier and further having a cavity therein, an upper surface, a lower surface, at least one aperture therethrough, and a plurality of circuits located in a portion of the cavity therein connected to the at least one aperture therethrough;
a semiconductor device having an active surface having a plurality of bond pads thereon, the semiconductor device located within the cavity of the second carrier;
a first connector between at least one circuit of the plurality of circuits located in the portion of the cavity of the second carrier and at least one bond pad of the plurality of bond pads on the active surface of the semiconductor device located within the cavity of the second carrier;
encapsulant material filling a portion of the cavity in the second carrier; and
connector material located in a second aperture in the second carrier connected to the connector material in the at least one aperture in the first carrier.

34. (Cancelled)